CLAIMS:

1. An imaging method comprising the steps:

a) generating a projection data record of an examination area (13) to be reconstructed by acquiring projections (p_j) from different projection directions (j), wherein a projection direction (j) is allocated to each projection (p_j) and a projection geometry is allocated to each projection direction (j),

b) providing an iteration operator ($I_{j,i}$), that is dependent on a first projection direction (j), a second projection direction (i) and a filter operator (F_i) allocated to the second projection direction (i), and determining, in each case, a filter operator (F_i) for each projection direction (i), the filter operators (F_i) being adapted such that an averaging over all iteration operators ($F_{j,i}$), that have the same first projection direction (j) but different second projection directions (i), substantially produces an identity operator (id) and in which, on application of an iteration operator ($I_{j,i}$) to a projection (p_j) the following operations are carried out:

- back projection of the projection (p_j) in a projection geometry, which is allocated to the first projection direction (j),

- forward projection of the back-projected values in a projection geometry, which is allocated to the second projection direction (i),

- filtering the forward-projected values with a filter operator of the second projection direction (i),

- back projection of the filtered values in a projection geometry, which is allocated to the second projection direction (i),

- forward projection of the filtered, back-projected values in a projection geometry which is allocated to the first projection direction (j),

c) reconstruction of an image of the examination area from the projections (p_j) with the aid of a filtered back projection, in which the filter operator (F_j) of the corresponding projection direction (j) is applied to each projection (p_j).

2. An imaging method as claimed in claim 1, characterized in that a filter operator (F_j) is iteratively determined in each case for each projection direction (j) prior to

reconstruction, wherein a filter operator (F_j^{k+1}) is allocated to each iteration step (k+1) for each projection direction (j), wherein a plurality of iteration steps (k+1) are carried out until an abort criterion is fulfilled, and wherein, in an iteration step (k+1), all filter operators (F_j^{k+1}) that are allocated to the iteration step (k+1), are determined before the next iteration step is carried out, and in that once an identity operator (id) and, for each projection direction (j), an initial filter operator (F_j^o) have been provided, in an iteration step (k+1) to determine the filter operator (F_j^{k+1}) of a specific projection direction (j) that is allocated to the respective iteration step (k+1), the following steps are carried out:

i) provision of an iteration operator ($I_{j,i}^k$) which, applied to a projection (p_j), carries out the following operations:

- back projection of the projection in a projection geometry, which is allocated to the specific projection direction (j),
- forward projection of the back-projected values in a projection geometry, which is allocated to the second projection direction (i),
- filtering the forward-projected values with the filter operator (F_i^k) of the second projection direction (i), which is allocated to the previous iteration step (k),
- back projection of the filtered values in a projection geometry, which is allocated to the second projection direction (i),
- forward projection of the filtered, back-projected values in a projection geometry, which is allocated to the specific projection direction (j).

ii) determination of an iteration operator ($I_{j,i}^k$), in each case, for each projection direction, the second projection direction (i) of the respective iteration operator ($I_{j,i}^k$), being the respective projection direction,

iii) determination of an average operator ($\bar{I}_j^k$) by averaging over all iteration operators ($I_{j,i}^k$) determined in step ii)

iv) determination of the filter operator (F_j^{k+1}) of the specific projection direction (j), which is allocated to the current iteration step (k+1), by subtracting the average operator ($\bar{I}_j^k$) from the sum of the filter operator (F_j^k) of the specific projection direction (j), which is allocated to the previous iteration step (k), and the identity operator (id).

3. Imaging method as claimed in claim 1, characterized in that generation of a projection data record with a computer tomograph in step a) comprises the following steps:

- generating a beam cluster (4) penetrating the examination area (13), with a beam source (S),

- generating a relative movement between the beam source (S), on the one hand, and the examination area (13), on the other hand, which comprises a rotation about an axis of rotation (14), in which the beam source (S) adopts different beam source positions, and
- acquiring measured values that depend on the intensity of beams in the beam cluster (4) beyond the examination area (13), with a detector unit (16) during the relative movement at different beam source positions, wherein measured values, the beams of which are emitted from the same beam source position, form a projection (p_j), a projection direction (j) is allocated to each projection (p_j), the projection direction (j) pointing from the respective beam source position to a center of the detector unit, and the projection geometry that is allocated to the respective projection direction (j), is defined by the respective beam source position and the position of the detector unit and the beam course determined thereby.

4. An imaging method as claimed in claim 3, in which a trajectory, on which the beam source (S) moves relative to the examination area (13), extends such that an operator which, applied to a projection, projects said projection back along beams of a first beam source position and projects the back-projected values forward along beams of a second beam source position, is the same for first and second beam source positions, which have the same spacing along the trajectory, and, in particular, the trajectory is circular or helical, characterized in that the same filter operator is used for each projection direction.

5. An imaging method as claimed in claim 1, characterized in that the projection data record in step a) is generated with a positron emission tomograph or a single photon emission computer tomograph.

6. An imaging method as claimed in claim 1, characterized in that at least some of the operators are discretized.

7. An imaging method as claimed in claim 1, characterized in that at least some of the operators are linear functionals.

8. A computer tomograph for carrying out the method as claimed in claim 3 comprising
- a beam source (S) for generating a beam cluster (4) penetrating an examination area (13),

- a drive arrangement (2, 5) for generating a relative movement between the beam source (S), on the one hand, and the examination area (13), on the other hand, which comprises a rotation about an axis (14) of rotation,
- a detector unit (16) for acquiring measured values that depend on the intensity of beams in the beam cluster (4) beyond the examination area (13), during the relative movement,
- a reconstruction unit (10) for reconstructing a computer tomography image of the examination area (13) from the measured values,
- a control unit (7) for controlling the beam source (S), the drive arrangement (2, 5), the detector unit (16) and the reconstruction unit (10) according to the steps as claimed in claim 3.

9. A computer program for a control unit (7) for controlling a beam source (S), a detector unit (16), a drive arrangement (2, 5) and a reconstruction unit (10) of a computer tomograph for carrying out the steps as claimed in claim 3.